

Final Determination on the Regulatory Test for the Establishment of a new Shenton Park Zone Substation

Submitted by Western Power

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Economic Regulation Authority

WESTERN AUSTRALIA

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For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 6557 7900

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Contents

Final Determination	4
Reasons	5
The Regulatory Test	5
Western Power's Major Augmentation Proposal	9
Reasons for the Proposed Augmentation	9
Public Consultation Undertaken by Western Power	10
Requirements of the Access Code	10
Western Power's Consultation	11
Submissions to the Authority	11
Considerations of the Authority	12
Identification of Alternative Options	13
Requirements of the Access Code	13
Alternative Options Identified by Western Power	13
Submissions to the Authority	14
Considerations of the Authority	14
Assessment of Net Benefits of Alternative Options	15
Requirements of the Access Code	15
Western Power's Assessment of Alternative Options	15
Submissions to the Authority	17
Considerations of the Authority	17

Final Determination

1. On 10 July 2012, the Economic Regulatory Authority (Authority) received a major augmentation proposal from Western Power submitted under section 9.15 of the Electricity Networks Access Code 2004 (**Access Code**).¹ The major augmentation proposal comprises information required to be provided by Western Power in respect of the regulatory test under Chapter 9 of the Access Code for its proposed major augmentation – the establishment of a new Shenton Park zone substation. Western Power's major augmentation proposal is available on the ERA's website.²
2. As part of its assessment of Western Power's major augmentation proposal, the Authority undertook public consultation as provided for under section 9.19 of the Access Code. As part of this consultation, the Authority prepared an issues paper on the major augmentation proposal to assist interested parties in understanding Western Power's proposal. The invitation for submissions was published by the Authority on 3 August 2012 with a closing date for submissions of 17 August 2012. Six submissions were received from residents living in the Western Suburbs region.
3. To assist with its assessment of Western Power's major augmentation proposal, the Authority commissioned independent technical advice from Geoff Brown and Associates (**GBA**).³
4. Having regard to Western Power's major augmentation proposal, the independent advice from GBA, and submissions received from interested parties, the Authority has determined, pursuant to section 9.18 of the Access Code, that the regulatory test as defined in sections 9.3 and 9.4 and applied in accordance with section 9.20 of the Access Code is satisfied, in that:
 - Western Power has made a defensible statement under section 9.16(b) of the Access Code that the proposed new Shenton Park zone substation maximises the net benefits after considering alternative options;
 - Western Power has applied the regulatory test properly to the proposed new substation:
 - using reasonable market development scenarios which incorporate varying levels of demand growth at relevant places; and
 - using reasonable timings, and testing alternative timings, for project commissioning dates and construction timetables for the major augmentation and for alternative options; and
 - Western Power has conducted a consultation process that meets the requirements of section 9.16(c) of the Access Code.
5. However, the final design of the substation in relation to the whole Western Terminal redevelopment will be subject to the new facilities investment test. For the reasons set out below, the Authority is not convinced that the current proposed design and

¹ Western Power, July 2012, Submission to the Economic Regulation Authority Major Augmentation Proposal Establish New Shenton Park Zone Substation (hereafter referred to as "**major augmentation proposal**").

² Economic Regulation Authority website:
http://www.erawa.com.au/3/1218/48/shenton_park_zone_substation_augmentation_-_regula.pm

³ Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012.

scope is the most cost effective approach available and expects that Western Power will take account of the matters raised in this decision, including the report prepared by the Authority's technical consultant, in developing its project design.

Reasons

6. The Authority's determination on the major augmentation proposal is limited to the scope of the regulatory test under Chapter 9 of the Access Code. It addresses the question of whether the proposed new Shenton Park zone substation maximises the net benefit to generators, transporters and consumers of electricity after consideration of alternative options for meeting demands for electricity services. This includes consideration of constraints in the electricity system, in particular having regard to all reasonable alternative options, including the likelihood of each alternative option proceeding. While the Authority's determination is necessary for Western Power to commit to the proposed new zone substation, approvals and permissions relating to other matters are outside of the Authority's role and responsibilities. Such matters include environmental management and the commencement and timing of works to the extent that these matters do not affect net benefits.
7. In these reasons the following matters are addressed:
 - the requirements for the regulatory test under Chapter 9 of the Access Code;
 - the need for, and stated objectives of, Western Power's proposed new zone substation;
 - the adequacy of consultation undertaken by Western Power;
 - the identification of "alternative options" to the proposed new zone substation; and
 - the assessment of the relative net benefits of Western Power's proposed new zone substation and alternative options.

The Regulatory Test

8. Chapter 9 of the Access Code establishes the regulatory test that is applied to proposals for major augmentations of a covered network.
9. The regulatory test prevents a service provider from committing to a major augmentation of a network until it has been determined that the requirements of the regulatory test have been satisfied. The Authority is of the opinion that the purpose of the regulatory test is to determine whether a proposed augmentation to an electricity transmission and/or distribution network is the best way of developing the wider electricity system to provide covered services. The test requires that the service provider demonstrate that augmentation of the network is the best means of developing the electricity system compared to alternative options, such as alternative network investments, investment in generation or management of electricity demand.

10. The regulatory test is required only for “major augmentations” of a covered network, as defined in Chapter 1 of the Access Code⁴:

“major augmentation” means an augmentation for which the new facilities investment for the shared assets:

- (a) exceeds \$10 million (CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of a distribution system; and
 - (b) exceeds \$30 million (CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of:
 - (i) a transmission system;
 - (ii) both a distribution system and a transmission system.
11. Under section 9.2 of the Access Code, a service provider must not commit to a major augmentation before the Authority determines, or is deemed to determine, that the regulatory test is satisfied.
12. The process of the regulatory test commences with the submission, by a service provider to the Authority, of a “major augmentation proposal”. This may occur either:
- with the major augmentation proposal submitted as part of a proposed access arrangement, and the Authority’s determination of whether the regulatory test is satisfied forming part of the Authority’s decision on the proposed access arrangement (section 9.10 of the Access Code); or
 - with a major augmentation proposal submitted other than as part of a proposed access arrangement and the Authority’s determination on whether the regulatory test is satisfied being a determination separate from the approval process for a proposed access arrangement (section 9.15 of the Access Code).
13. Western Power’s major augmentation proposal that is the subject of this determination has been submitted under the second of these two processes (i.e. under section 9.15 of the Access Code).
14. Section 9.16 of the Access Code establishes the requirements for a major augmentation proposal submitted to the Authority other than as part of a proposed access arrangement:

9.16 A major augmentation proposal submitted under section 9.15:

- (a) must describe in detail each major augmentation to which the major augmentation proposal relates; and
- (b) must state that, in the service provider’s view, each proposed major augmentation maximises the net benefit after considering alternative options; and
- (c) must demonstrate that the service provider has conducted a consultation process in respect of each proposed major augmentation which:
 - (i) included public consultation under Appendix 7; and
 - (ii) gave all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentations, and that the service provider had regard to those views and alternative options; and

⁴ 2012 CPI adjusted amounts are: a) \$11.1 million and b) \$33.2 million as published in the Consumer Price Index Adjustment Notice by the ERA, 30 May 2012, http://www.era.gov.au/2/306/48/electricity_access_electricity_networks_access_co/pm

- (iii) involved the service provider giving reasonable consideration to any information obtained under sections 9.16(c)(i) and 9.16(c)(ii) when forming its view under section 9.16(b);
 - and
 - (d) must comply with the current requirements published under section 9.17.
 - (e) may include a request that the Authority give prior approval under section 6.72 in respect of the new facilities investment for one or more proposed major augmentations.
- 15. “Alternative options” and “net benefit”, referred to in section 9.16(b), are defined under Chapter 1 of the Access Code:

“alternative options”, in relation to a major augmentation, means alternatives to part or all of the major augmentation, including demand-side management and generation solutions (such as distributed generation), either instead of or in combination with network augmentation.

...

“net benefit” means a net benefit (measured in present value terms to the extent possible) to those who generate, transport and consume electricity in (as the case may be):

 - (a) the covered network; or
 - (b) the covered network and any interconnected system.
- 16. For a major augmentation proposal submitted to the Authority other than as part of a proposed access arrangement, the requirements for the regulatory test to be satisfied are set out in section 9.20 of the Access Code:

9.20 The test in this section 9.20 is satisfied if the Authority is satisfied that:

 - (a) the service provider’s statement under section 9.16(b) is defensible; and
 - (b) the service provider has applied the regulatory test properly to each proposed major augmentation:
 - (i) using reasonable market development scenarios which incorporate varying levels of demand growth at relevant places; and
 - (ii) using reasonable timings, and testing alternative timings, for project commissioning dates and construction timetables for the major augmentation and for alternative options;
 - and
 - (c) the consultation process conducted by the service provider meets the criteria in section 9.16(c).
- 17. Section 9.18 of the Access Code establishes the timeframes for a determination by the Authority on whether the regulatory test is satisfied or not satisfied:

9.18 The Authority must in respect of a major augmentation proposal submitted under section 9.15 make and publish a determination whether the test in section 9.20 is satisfied or not satisfied, and must do so:

 - (a) if the Authority has consulted the public under section 9.19 – within 45 business days; and
 - (b) otherwise – within 25 business days, after receiving the augmentation proposal.

18. The role of the Authority is to consider the information provided by a service provider in the major augmentation proposal and to determine whether the regulatory test set out in section 9.20 of the Access Code is satisfied. Section 9.21 of the Access Code places the onus on the service provider to demonstrate that the regulatory test is satisfied.
 - 9.21 If the Authority is unable to determine whether the test set out in section 9.20 is satisfied or is not satisfied because the service provider has not provided adequate information (despite the Authority having notified the service provider of this fact and given the service provider a reasonable opportunity, having regard to the time periods specified in section 9.18, to provide adequate information), then the Authority may determine that the test in section 9.20 is not satisfied.
19. The Authority's role ends with the determination of whether the regulatory test is satisfied or not satisfied. If the latter determination is made, the Authority does not have a role to remedy any deficiency in the major augmentation proposal or to make any determination on the alternative option that may maximise net benefits.

Western Power's Major Augmentation Proposal

Reasons for the Proposed Augmentation

20. In considering the investment requirements for the Shenton Park zone substation, Western Power has assessed the potential long term development of the whole of the western suburbs over a 25 year period.
21. Western Power's submission states that the two key drivers for the major augmentation are that:
 - the existing 66 kV equipment (lines and substations) are progressively reaching the end of their economic and technical lives; and
 - the western suburbs have an underlying load growth that can no longer be sustained by the current network of 66 kV lines and zone substations.
22. Western Power believes it is essential to address these two issues and also notes the proposed augmentation has the benefit of providing synergies with the QEII hospital substation upgrade.

Demand Forecasts

23. Western Power stated in its major augmentation proposal that there are two applicable factors associated with growth in the western suburbs which impact on the proposal at Shenton Park. These are natural load growth and the expansion of the QEII Medical Centre which includes the construction of a new children's hospital.
24. Western Power believes that the load growth in the Western Terminal area over the next 25 years will be driven organically through residential and commercial customers. Developments in the area are expected to be centred on the rationalisation of existing land uses such as higher density residential and commercial buildings, with very few green field developments. Rezoning to high density residential areas has resulted in extensive developments of many high electricity-consumption residences.

Network Capability and Future Supply Requirements

25. Whilst forecast demand increases are an important factor, the most significant factor driving the proposed major augmentation relates to the current substation transformers age and condition. The majority of the transformers in the Western Terminal are more than 40 years old and have a condition rating of "poor" meaning they will require replacement within 10 to 15 years. Western Power assesses transformer condition on a scale of 1-10, where 1 represents a new asset and 10 is an asset in poor condition requiring immediate replacement. The Shenton Park zone substation currently has 3 power transformers, all of which are rated 10.
26. A further benefit of the proposed major augmentation is rationalisation of substations in the Western Terminal region.

Proposed New Shenton Park Zone Substation

27. Western Power has identified four options for the Western Terminal redevelopment and has based its proposed major augmentation on Option 3. The four options provided are set out in more detail below in paragraphs 51 to 53.

28. Under Option 3, the Shenton Park zone substation would have a new 132 kV/11 kV zone substation built on land adjacent to the existing substation. The new substation will contain two 75 MVA 132/11 kV transformers and two line circuits. The Shenton Park distribution network and the Herdsman Parade zone substation distribution network will be converted and upgraded from 6.6 kV to 11 kV.
29. As a result of the augmentation and other associated projects, the existing 66 kV/6.6 kV Shenton Park zone substation will be decommissioned in the years to follow, along with other western suburb zone substations including those at Herdsman Parade and the University.
30. Further details on the options considered for the major augmentation can be found in Western Power's major augmentation proposal on pages 8-10 and in Western Power's options paper on pages 14-22.

Public Consultation Undertaken by Western Power

Requirements of the Access Code

31. The requirements for Western Power to undertake public consultation on the major augmentation proposal are set out in section 9.16(c) of the Access Code:

9.16 A major augmentation proposal submitted under section 9.15:

...

- (c) must demonstrate that the service provider has conducted a consultation process in respect of each proposed major augmentation which:
 - (i) included public consultation under Appendix 7; and
 - (ii) gave all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentations, and that the service provider had regard to those views and alternative options; and
 - (iii) involved the service provider giving reasonable consideration to any information obtained under sections 9.16(c)(i) and 9.16(c)(ii) when forming its view under section 9.16(b);

...

32. Appendix 7 of the Access Code establishes the following requirements on Western Power in undertaking consultation on a major augmentation proposal:

- publication of an invitation for submissions (section A7.6);
- specification of the length of time allowed for the making of submissions that must be at least 10 business days and no greater than 20 business days (sections A7.7 and A7.9); and
- publication of submissions (section A7.20).

33. Appendix 7 would also allow, but not require, Western Power to:

- produce and publish an issues paper examining the issues relating to the major augmentation proposal (section A7.4);
- consider any submissions made after the time for making submissions has expired (section A7.21).

Western Power's Consultation

34. In its major augmentation proposal, Western Power indicates that its consultation process involved:
- Publication on 19 March 2012 of an Options Paper and an "Invitation for Submissions" on the websites of both Western Power and the Authority with the consultation period closing on 10 April 2012;
 - Two community forums held in the Western Terminal region at the Hollywood Bowling Club in Nedlands on 27 March 2012, which were attended by 13 participants;
 - Direct invitations were sent to stakeholders such as key industry representatives, major customers, State Government agencies, adjacent landowners (to the existing site) and the broader community to submit comments through forums, email or by mail.
35. Western Power's invitation for submissions included an options paper on the proposed new zone substation.⁵ This paper provided information on:
- background in relation to the area and substation;
 - information on the electricity demand for the region;
 - the forecast reliability of supply requirements;
 - a review of the four network options and discussion of non-network options;
 - an analysis of the options in line with the regulatory test requirements including a financial analysis of the four network options; and
 - a summary of reasons why the proposed new zone substation in option 3 is the preferred option.
36. Western Power's application notes that it received two email submissions (one from Local Government and another from a major customer) and three postal submissions. These submissions were not published by Western Power.
37. Western Power states that all verbal and written submissions have been summarised and incorporated in Attachment 2 of its major augmentation proposal application.⁶ It also notes that draft summaries of the workshops were provided to those that attended for their review and comment before the public comment period closed. Western Power notes that no responses were received.

Submissions to the Authority

38. Four submissions received by the Authority were from local residents who considered Western Power's consultation process was not adequate and had not included all affected local residents. Two of these submissions from local residents noted that they lived close to Shenton Park substation but had not been consulted about the proposed upgrade at all.

⁵ Western Power's options paper is reproduced in Attachment 1 of Western Power's Major Augmentation Proposal.

⁶ Western Power's Major Augmentation Proposal, Attachment 2 Response to Submissions Table 2.1.

39. All of the above submissions considered that the alternative options raised by residents had not been adequately addressed and were dismissed without being given due consideration. One of the submissions considered that the community forums were a case of just “going through the motions” and that any issues raised were not going to have any influence on the chosen option by Western Power.
40. A fifth submission received by the Authority was concerned that, despite the size of project, Western Power’s consultation was non-technical and essentially localised in nature. The submission considered that the consultation did not include sufficient technical or informed challenge to the assumptions underpinning either the incremental investment or the global strategy for the Western Terminal area.

Considerations of the Authority

41. The Authority is required to determine whether it is satisfied that Western Power has undertaken consultation in accordance with the requirements of section 9.16(c) of the Access Code; in particular:
- whether Western Power undertook consultation in accordance with the generic guidelines for consultation under Appendix 7 of the Access Code;
 - whether Western Power gave all interested parties a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentation;
 - whether Western Power has had regard to the views and alternative options put forward by interested parties; and
 - whether Western Power has given reasonable consideration to information obtained from interested parties through the consultation process.
42. From the information provided by Western Power, notices for the public forums were advertised in the West Australian newspaper and two local newspaper publications, the Western Suburbs Weekly and the Post Newspaper. Information regarding the forums and the public submission period was also available on the Western Power website and in a notice on the Authority’s website.
43. Based on the information above it appears that Western Power undertook a consultation process in accordance with Appendix 7 of the Access Code. Western Power advertised adequately the opportunities to participate in the consultation process and to make submissions, and made available information on the nature of the regulatory test and the proposed major augmentation.
44. The Authority does, however, note that there may be room for improvement by Western Power in consultation with the local community on projects affecting residents and communities in the future. In particular, Western Power should ensure that all residents within a reasonable distance of a proposed scheme are directly provided with details of the consultation process. The Authority notes that the community consultations were open to all and it is unfortunate that not all interested parties were aware of this.
45. The Authority notes that Western Power has summarised its responses to the issues raised in submissions received but has not published the submissions in full. The Authority has reviewed all the submissions received by Western Power and is satisfied that issues raised were included in Western Power’s summary. All

submissions that have not claimed confidentiality will be published on the Authority's website along with this Final Determination.

46. The Authority is satisfied that Western Power has given reasonable consideration to information obtained through its consultation process and accordingly, the Authority is satisfied that Western Power has conducted a consultation process in accordance with the requirements of section 9.16(c) of the Access Code.
47. Taking into account the information and submissions on the consultation program undertaken by Western Power, the Authority is satisfied that Western Power has adequately complied with section 9.16 of the Access Code.

Identification of Alternative Options

Requirements of the Access Code

48. Under section 9.16(b) of the Access Code, Western Power is required to have considered alternative options to the proposed new Shenton Park zone substation.
49. "Alternative options" is defined under Chapter 1 of the Access Code:

"alternative options", in relation to a major augmentation, means alternatives to part or all of the major augmentation, including demand-side management and generation solutions (such as distributed generation), either instead of or in combination with network augmentation.
50. The Authority has addressed, as separate matters, whether Western Power has identified all relevant alternative options to the proposed new Shenton Park zone substation and Western Power's assessment of the alternative options identified in its major augmentation proposal. This section of the Authority's determination addresses the former of these two matters (i.e. the identification of all relevant alternative options).

Alternative Options Identified by Western Power

51. In its major augmentation proposal, Western Power indicates that it considered non-network solutions and four options for the redevelopment of Western Terminal:

Non-network solutions:

- non-network solutions were not pursued by Western Power as it considered that, although forecast load growth could potentially be addressed through non-network solutions, the need to replace the assets due to their age and current condition could not be addressed by non-network solutions. Western Power's submission states that it will "continue to investigate non-network solutions as an integral part of its network planning and development process".⁷

Network solutions:

- Option 1 - Retain 66 kV network and upgrade network capacity;
- Option 2 - Shenton Park substation upgraded to 132/11 kV, Herdsman Parade substation load transferred to Shenton Park and Herdsman Parade decommissioned;

⁷ Western Power, Major augmentation proposal, p. 9.

- Option 3 - Shenton Park and Medical Centre substations upgraded to 132/11 kV, Herdsman Parade load transferred to Shenton Park, University load transferred to Medical Centre, Herdsman Parade and University substations decommissioned;
 - Option 4 - Full 132 kV migration of Shenton Park, Medical Centre, Wembley Downs and Nedlands substations with Herdsman Parade and University substations decommissioned.
52. The work required for the proposed Shenton Park zone substation varies dependant on which of the above options is chosen.
53. The requirements for the zone substation for each of the above options are as follows:
- Option 1 – 3 x 35 MVA 66/11 kV transformers
 - Option 2 – 2 x 75 MVA 132/11 kV transformers (dual winding 75 MVA)
 - Options 3 or 4 – 2 x 75 MVA 132/11 kV transformers (dual winding 75 MVA) with provision for two additional 132 kV feeders
54. Western Power indicated in its major augmentation proposal that no alternative options that could effectively (economically) alleviate the identified constraints were proposed by other parties through its public consultation process.

Submissions to the Authority

55. The Authority received one submission identifying, amongst other suggestions, an alternative option of distributing the base load amongst the existing facilities such as Wembley and Hollywood rather than putting everything into Shenton Park.
56. A further option was discussed at both forums of co-locating the Shenton Park substation with the Western Terminal to one location.
57. There were no other alternative options identified other than those provided by Western Power in their major augmentation proposal and the alternative options mentioned above via submission and at the public forums conducted by Western Power.

Considerations of the Authority

58. In its determination on the major augmentation proposal, the Authority has given consideration to whether Western Power has identified all relevant alternative options to the proposed new Shenton Park zone substation.
59. In relation to the potential for distributing base load amongst other existing facilities, the Authority's technical adviser notes that consolidating the load at Shenton Park and the Medical Centre will reduce the overall transmission footprint, which will lower the overall impact of the transmission system on the built environment and reduce costs.
60. In relation to co-locating Shenton Park substation with the Western Terminal, Western Power indicates in its application that this option was considered during the initial planning stages; however, it was not a viable option because it would not alleviate the requirement for a transformer at Shenton Park and would cost significantly more than the other available options.

61. The Authority's technical adviser considers it is unlikely that any non-network alternative options would address the emerging issues identified in the SKM report. GBA states that:

*"Even if non-network options were identified, they would only address the issue of increasing demand and would not be effective responses to the limitations caused by the 6.6 kV distribution network voltage or the poor condition of the zone substation transformers serving the load area."*⁸

62. The Authority's technical adviser notes that all four options assume that Western Terminal will remain as a hub substation for the load area and all zone substations will be supplied from Western Terminal, irrespective of whether the supply is at 132 kV or 66 kV. GBA does not consider there is any technical reason for 132 kV substations to be supplied directly from Western Terminal and notes that, as an interim measure, Western Power is planning to divert the Northern Terminal-Western Terminal line to supply Shenton Park. GBA notes that if this arrangement was made permanent, it would avoid the need to construct two new 132 kV circuits between Western Terminal and Shenton Park and install two new 132 kV circuit breakers at Western Terminal which would reduce the cost of the Shenton Park project. GBA notes that Western Power should endeavour to keep all options open for as long as possible in planning and developing the network.
63. The Authority notes that, potentially there are better variations of some of the options identified by Western Power which should be considered. However, as the proposed new substation at Shenton Park would still be a component of such options, the Authority is satisfied that Western Power has adequately identified and considered alternative options for the purposes of the regulatory test in relation to the Shenton Park substation.

Assessment of Net Benefits of Alternative Options

Requirements of the Access Code

64. Under section 9.20(a) of the Access Code, the Authority must determine whether it is satisfied that Western Power has made a defensible statement that, under section 9.16(b), the proposed major augmentation maximises the net benefit after considering alternative options.
65. The Authority has addressed, as separate matters, whether Western Power has identified all relevant alternative options to the proposed new Shenton Park zone substation and Western Power's assessment of the alternative options identified in its major augmentation proposal. This section of the Authority's determination addresses Western Power's assessment of alternative options.

Western Power's Assessment of Alternative Options

66. Western Power has assessed alternative options by:
- identifying a set of potential alternative options (as described in the previous section of this determination, refer to paragraph 51 above); and
 - comparing the viable set of alternative options by a comparison of the present value of costs of each option over a 25 year project period, the remaining

⁸ Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012, p.6.

transmission capacity (measured in MVA) at the end of the 25 year review period (year 2035) and dividing the net present cost (**NPC**) by the remaining transmission MVA at 2035 to give a cost of the remaining transmission MVA in present value terms.

67. As set out in paragraph 51, four alternative network options were identified by Western Power for the Western Terminal redevelopment. The requirements for the Shenton Park substation differed, depending on which option is selected, as set out in paragraph 53.
68. Western Power has compared these viable solutions by comparing the net present cost (**NPC**) over a 25 year period as shown in table 1 below.⁹ Table 1 also shows the forecast remaining transmission capacity in 2035.

Table 1 Reproduction of Western Power’s “2035 Financial Characteristics” table

Option	Description	Net Present Cost (\$M)	Forecast Unused Transmission Capacity in 2035 MVA	\$M (NPC) / MVA available in 2035
1	Retain 66 kV network and upgrade network capacity	117.7	42	2.80
2	Shenton Park upgraded to 132 kV with Herdsman Parade decommissioned.	114.8	92	1.25
3	Shenton Park & Medical Centre upgraded to 132 kV with Herdsman Parade & University decommissioned.	112.1	107	1.05
4	Full 132 kV migration of Shenton Park, Medical Centre, Wembley Downs & Nedlands with Herdsman Parade & University decommissioned.	119.4	117	1.02

Notes: Discount rate is the approved weighted average cost of capital for the AA2 period (i.e. 7.98%, real pre-tax)
Net Present Cost (NPC) period is 2010-2035

69. Western Power has also undertaken sensitivity analysis on its cost and demand growth estimates and considered other factors such as electrical losses, differences in operating costs, sale and remediation of decommissioned substation sites and other technical issues.¹⁰ As a result, Western Power considers that Option 3 maximises the net benefits when considering alternative options. Western Power has also provided a comparison of the advantages and disadvantages of options 3 and 4 in its Options Paper at page 32.

⁹ Western Power, Major augmentation proposal, p. 10.

¹⁰ Western Power, January 2012, Options Paper, Establish New Shenton Park Zone Substation, p. 26-30.

70. The investment requirements for the Shenton Park zone substation major augmentation, for each option are shown in Table 2 below which is reproduced from Western Power's major augmentation proposal.¹¹

Table 2 Reproduction of Western Power's "Shenton Park Network Option Costs" table

Option	Proposed Augmentation	Cost, \$M (nominal 2010)
1	New Zone Substation at existing site with 3 x 35 MVA 66/11 kV transformers	17.89
2	New Zone Substation at existing site with 2 x 75 MVA 132/11 kV transformers (dual winding 75 MVA)	23.29
3 & 4	New Zone Substation at existing site with 2 x 75 MVA 132/11 kV transformers (dual winding 75 MVA) with provision for two additional 132 kV feeders	26.03

Notes: Discount rate is the approved weighted average cost of capital for the AA2 period (i.e. 7.98%, real pre-tax)
Net Present Cost (NPC) period is 2010-2035

71. Options 2, 3 and 4 would also include a cost of \$9.44 million (nominal 2010 dollars) relating to the upgrading of the distribution network from 6.6 kV to 11 kV at Herdsman Parade so it is consistent with Shenton Park. With the addition of these costs to the costs outlined in Table 2 (excluding option 1) the major augmentation costs require regulatory test approval.
72. Option 1 does not require the upgrade of the Herdsman Parade zone substation so no additional costs would be incurred.

Submissions to the Authority

Demand Forecasts

73. One submission received by the Authority queried both Western Power's forecasting assumptions and the appropriateness of Western Power's application of system wide data to justify regional expenditure. Generally, the submission appears to be concerned that the demand forecasts used by Western Power are not sufficiently robust in terms of predicting demand for the relevant area and may, as a result, overstate demand.

Analysis of Net Benefits

74. One submission received by the Authority noted support for Western Power's chosen option.

Considerations of the Authority

75. The Authority has considered whether Western Power has assessed alternative options in accordance with the requirements of the Access Code. The relevant criteria under the Access Code is whether the Authority is satisfied that Western Power has appropriately determined the net benefits of the alternative options and, ultimately, whether the Authority considers that Western Power has made a defensible statement that the proposed major augmentation maximises the net benefit after considering

¹¹ Western Power, Major augmentation proposal p. 10.

alternative options. If the Authority determines that this criteria is not satisfied, it is not the role of the Authority itself to remedy any deficiency in the assessment of net benefits or to reach its own conclusion on the alternative option that would maximise the net benefit.

76. The matters that the Authority has taken into account are set out below.

Demand Forecasts

77. As noted in paragraph 73 above, a submission made to the Authority considered Western Power's demand forecasts to be out of date and not taking into account all factors affecting not only Shenton Park but the whole Western Terminal region and the South West Interconnected System in general.

78. The Authority's adviser agrees with the submission in that there are issues with Western Power's forecasts that require further consideration. GBA state that:

"The current forecast 2013 POE 10 peak demand for 2013, as provided to us by Western Power, is consistent with the actual peak demands in 2011 and 2012 once a margin for uncertainty is provided for. However this figure is 15 MVA lower than the 170 MVA 2013 demand used by SKM in its report.

We have compared the rate of growth indicated in the SKM report with the overall rate of growth in demand for the whole of the SWIN as reported in the 2011 APR forecast. In 2013 the forecast peak demand of 170 MVA represents 3.90% of the POE 10 forecast peak demand for the total SWIN. In 2017 and 2022 (the final year of the APR 2011 forecast) these ratios are 3.91% and 3.93%. While these differences are small, they suggest that Western Power is expecting that demand within the Western Terminal load area is expected to grow at a marginally faster rate than demand across the SWIN as a whole"¹²

79. GBA were of the opinion that the SKM report could have been improved if alternative network development options had been sensitivity tested against both high and low economic growth demand forecasts to demonstrate their robustness to a range of load growth outcomes.
80. Noting the advice to the Authority, the Authority accepts that forecasts of electricity demand are inherently subjective and contingent on assumptions about the probability of new loads eventuating. Taking these matters into account, along with information submitted by Western Power and submissions to the Authority, the Authority considers that the demand forecasting procedures used by Western Power are consistent with good industry practice and form an appropriate basis for the consideration of alternative options with regards to the Regulatory Test.
81. The Authority notes and agrees with GBA's comment that the SKM report could have been improved if alternative network development options had been sensitivity tested against both high and low economic growth demand forecasts to demonstrate their robustness to a range of load growth outcomes
82. However, the Authority expects that Western Power will continue to update its demand forecasts for the Western Terminal region and ensure its network investment plan is adjusted accordingly.

¹² Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012, p. 5.

Feasibility Analysis of Alternative Options

83. Western Power's consideration of the feasibility of alternative options is based on whether the option deals with the issues in relation to asset condition and meets forecast demand increases.

Analysis of Net Benefits

84. Western Power has assessed the viable options by comparing the net present cost for the four Western Terminal redevelopment options. Western Power has also considered the remaining transmission capacity at the end of the 25 year review period (2035) in MVA and compared the cost of this remaining capacity using net present cost analysis.
85. As a result of this analysis Western Power has chosen Option 3 as the preferred option.
86. The Authority's technical adviser has reviewed Western Power's reports and analysis and states in its report:

*We note that the NPC of Option 4, the highest cost but technically superior option, is only \$7.3 million or 6.5% higher than the preferred Option 3. Given that this cost differential is relatively small, we have looked at the cost benefit analysis more closely to consider whether all relevant factors have been taken into account and, in particular, whether the choice of option would impact the design and cost of the proposed Shenton Park development covered by this regulatory test application.*¹³

87. In doing so, GBA has identified several areas in which further analysis is required to determine the most appropriate course of action and if the task is actually required including line configuration within the Western Terminal.
88. GBA also make note regarding SKM's report that:

The cost benefit analysis also gives no weight to the benefits of minimising the number of transmission lines running through the supply area. These benefits are:

- a reduction in the impact of the overhead transmission lines in the amenity value to the community. The potential for removing older, low capacity lines should make it easier to gain community acceptance in the consultation process;*
- a reduction in maintenance costs, which are directly related to line length; and*
- a likely reduction in losses, since a solution that minimises the impact on the community would require all lines and substations to operate at 132 kV.*

*Inclusion of these benefits in the analysis is likely to narrow the NPC gap between Options 3 and 4.*¹⁴

89. Accordingly, GBA believes that Option 4 should be given further consideration before the project is submitted as part of the New Facilities Investment Test application. GBA also considers that Western Power should undertake further analysis comparing the design with potential alternative options including but not necessarily limited to:

¹³ Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012, p. 7.

¹⁴ Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012, p. 8.

- excluding the construction of new 132 kV circuits between Western Terminal and Shenton Park on the basis that these are not required at this stage and can be installed at a later date if found to be necessary; and
- installing 3x35 MVA transformers rather than the 2x75 MVA units to reduce the risk of transformer over-capacity and potential 11 kV feeder congestion.

90. As an overall recommendation, GBA states:

We recommend that the Authority grant regulatory test approval for the construction of the proposed new 132/11 kV substation at Shenton Park on the basis that:

- *no non-network alternative has been identified, or is likely to be available, that would address emerging issues related to both the capacity and condition of the existing transmission and distribution network with the Western Terminal load area; and*
- *the new substation at Shenton Park is a component of all identified development options that are likely to be cost effective.*¹⁵

91. The Authority notes that under the requirements of the Access Code, the Authority is only able to determine whether the regulatory test is satisfied or not satisfied in relation to the major augmentation proposed that is submitted by the service provider. The proposed major augmentation, which is the subject of this determination, is focused on the new Shenton Park zone substation, and is primarily driven by the poor condition and age of the existing assets as well as forecast increases in demand.
92. The Authority notes the advice of its technical adviser that the proposed substation for Shenton Park is a component of all identified development options that are likely to be cost effective, albeit that the design of the project requires further review.
93. Accordingly, the Authority has determined that the Regulatory Test has been satisfied for the establishment of a new Shenton Park zone substation. However the final design of the substation in relation to the whole Western Terminal redevelopment will be subject to the new facilities investment test. For the reasons outlined above, the Authority is not convinced that the proposed design and scope is the most cost effective approach available and expects that Western Power will take account of the matters raised in this decision, including the report prepared by the Authority's technical consultant, in developing its project design.

¹⁵ Geoff Brown and Associates, Technical Review of Western Power's Shenton Park zone substation Regulatory Test application, September 2012, p. 1.